

Work Order ID 135165

July 31, 2015 3:25:32 PM

Page 1

Item ID: D350-748-243 **URN** Accept

Revision ID:

Item Name: Crosstube Installation, High Alt

Start Date: 7/31/2015 Start Qty: 1.00 ***1***

Required Date: 8/14/2015 Req'd Qty: 1.00 ***1***

Reference:

N900040100

Setup Start ***NS1***

Stop ***NS2***

Cust Item ID:

Customer:

Approvals: Process Plan: **SK** Date: **20150731** Tooling:

Run Start ***NR1***

QC: Date: SPC (Y/N): Date: Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-243	A

100 0.00

100

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.03

1-Fill tube with sand & install plugs on both ends as per Folio

2-Turn first side as per Folio

3- File transition lines smooth.

FOLIO REV: **HA**

DWG REV: **HA**

110

110

QC

Quality Control

C1- Inspection performed by CMM

0.00

Memo

0.00

manl
15/08/14

manl
15/08/18

DQA:

Date: 15/09/28



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed

Date: 15/09/22

Work Order update only

Work Order: <u>135165</u> Part No. <u>0350-748-243TRV</u> NCR No. <u>15-5359</u>	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☒ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☒</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>			Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																	
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Date: <u>15/9/3</u>	Step #: <u>130</u>	QTY Effective: <u>1</u>	MRB (QSI042) Approval DAS 12 9-89 <u>15/9/3</u>																																																																	
Description Work Order Deviation		Disposition		Completed By DAS <u>47</u> 15-9-99 9-89																																																																
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Work Order ID 135165

July 31, 2015 3:25:33 PM

135165

Page 2

Item ID: D350-748-243TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Installation, High Aft

Start Date: 7/31/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00				(	Ø		
120	MORI SEIKI CNC LATHE LARGE								
Mori Seiki	Memo	0.05							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio _____ 2- File transition lines smooth. 3-Scribe Part & Hatch as per Dwg D350-748-143 FOLIO REV: <u>M</u> DWG REV: <u>8</u>								
130	QC1- Inspection performed by CMM	0.00				(	Ø		
130									
QC	Memo	0.00							
Quality Control									
140	QC8- Inspect parts - second check	0.00				/	Ø		
140									
QC	Memo	0.00							
Quality Control									

Amml
15/08/18**P.T.O.**

First Page

mml
15/08/20

DAS

47

9-89

15-09-09

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

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Page 3

July 31, 2015 3:25:33 PM

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Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Installation, High Aft

Start Date: 7/31/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/14/2015 Req'd Qty: 1.00

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Customer:

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Run Start

NR1

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SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150		0.00							
150	Large Fab								
Crosstubes	Memo	0.02							
Crosstubes	1-Grind machining marks								
190		0.00							
190	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: <u>LAG 003</u>								
200		0.00							
200	QC21- Final Inspection - Work Order Release								
QC	Memo	0.02							
Quality Control									

SA 20150921

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

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Date :	Step #:	QTY Effective :		MRB (QSI042) Approval																																																																									
Description Work Order Deviation			Disposition																																																																										
						Completed By																																																																							
						Lead hand / Supervisor Approval Verification																																																																							
QC / QA Coordinator Approval																																																																													
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Picklist Print

July 31, 2015 3:25:37 PM

Page 1

Work Order ID: 135165

135165

Parent Item: D350-748-243TRN

D350-748-243TRN

Parent Item Name: Crosstube Installation, High Aft

Start Date: 7/31/2015

Required Date: 8/14/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: PRELIM New Issue LL 12.05.08

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6021-125		Manufactured	No				Each	103.0000		1			

D6021-125

**

Crosstube Material - 17-4Ph SS

Location

Loc Qty

Loc Code

HALL

71

127271

35

127272

16

85076

20

LG

32

127272

32

_____ 1 mm L 15/08/13

Item	Qty -243	Part Number	Description
1	X	D350-748-243	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6021-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D5123-7	CLAMP CUSHION
5	1	AETC-1032	INSERT
6	2	MS21920-20 OR MS21920-21-22	CLAMP (PER DART SPEC. M-MS21920-20/-21-22)
7	1	NAS1149C0363R	WASHER (OR AN960C10)
8	1	NAS1635-3-8	SCREW (OR MS51958-63)
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125
FINISHED LENGTH AFTER TURNING = 124.70±0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-243" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIPPING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

135165

SA 00150807 RELEASED
UNDER REVIEW
2015 MAR 18
ECN 15-547
15/4/2015
URF 15-541

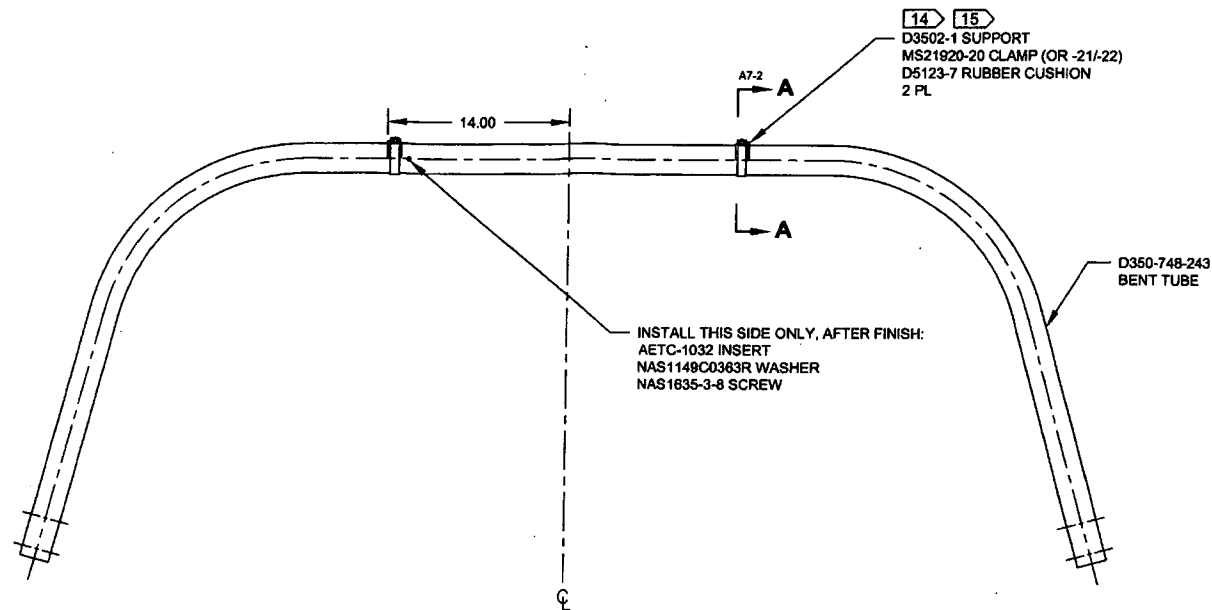
A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN	AP		
DRAWN	AP		
CHECKED	AP		
MFG. APPR.	AP		
APPROVED	AP		
DE APPR.	AP		
DATE	15.01.21		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

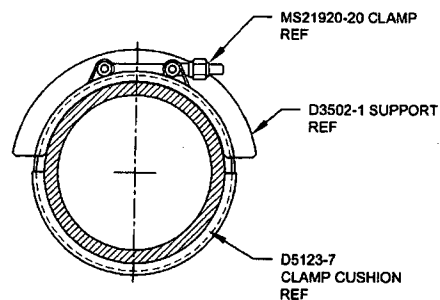
DRAWING NO. D350-748-243
TITLE CROSSTUBE (AS 350/355 HI AFT)

REV. A
SHEET 1 OF 4
SCALE NTS

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**D350-748-243
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

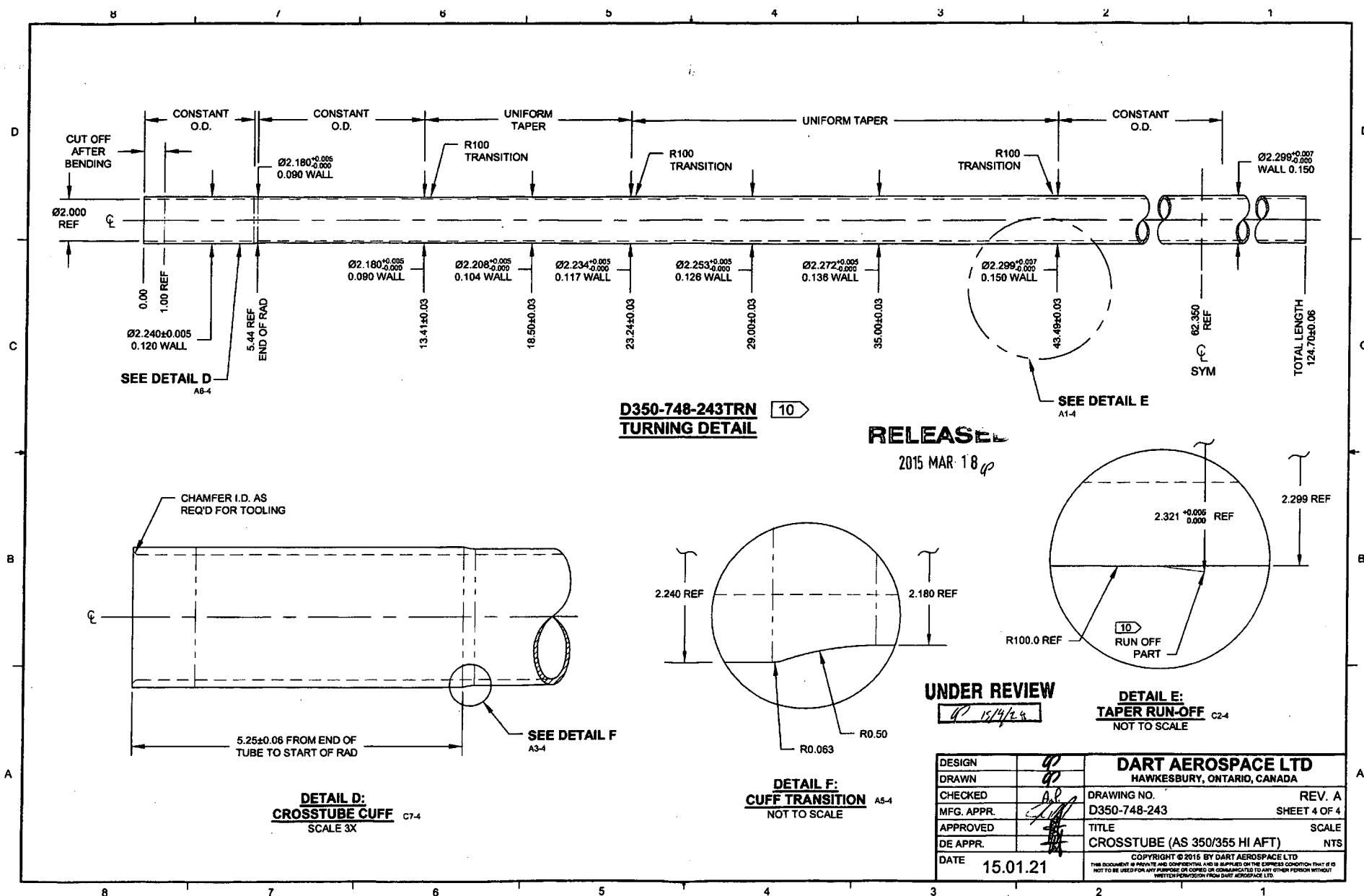
UNDER REVIEW

15/4/22

RELEASED

2015 MAR 18

DESIGN	98	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	98		
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	7/11	D350-748-243	SHEET 2 OF 4
APPROVED	7/11	TITLE	SCALE
DE APPR.	7/11	CROSSTUBE (AS 350/355 HI AFT)	NTS
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DART AEROSPACE LTD		Work Order:	135165
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: <i>NA mem</i>		Page 1 of 2	

243
mem

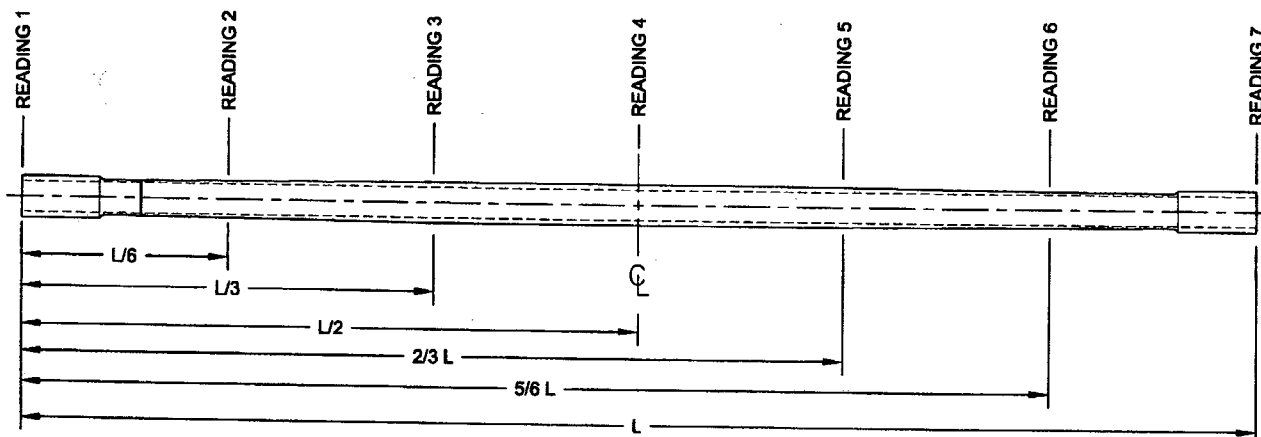
FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	✓		vern	CNC-08
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.184	✓			
	2.208	+0.005/-0.000	2.212	✓			
	2.234	+0.005/-0.000	2.236	✓			
	2.253	+0.005/-0.000	2.254	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.304	✓			
	0.063	+/-0.010	.063	✓		vern	CNC-08
	5.25	+/-0.060	5.26	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
SIDE B	2.240	+0.005/-0.000	2.245	✓		vern	CNC-08
	2.180	+0.005/-0.000	2.184	✓			
	2.180	+0.005/-0.000	2.182	✓			
	2.208	+0.005/-0.000	2.210	✓			
	2.234	+0.005/-0.000	2.235	✓			
	2.253	+0.005/-0.000	2.254	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.303	✓			
	0.063	+/-0.010	.063	✓		vern	CNC-08
	5.25	+/-0.060	5.26	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
	124.70	+/-0.060	124.700	✓		tape	LG-11

DART AEROSPACE LTD		Work Order: 135165
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number: D350-748-241
Inspection Dwg: D350-748-241 Rev: A <i>mmml</i>		Page 2 of 2

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mmml

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L = 0"	.132	.129	.126	.130	.006	0.030"
READING 2 L = 21	.125	.116	.113	.121	.012	
READING 3 L = 42	.152	.162	.162	.155	.010	
READING 4 L = 62	.157	.159	.160	.158	.003	
READING 5 L = 83	.153	.157	.159	.157	.006	
READING 6 L = 104	.103	.117	.136	.124	(-.033)	
READING 7 L = 124	.124	.129	.135	.129	.011	

Dwg A

0.111 6.008

Calibration Result

Actual Block Thickness: 100 .500

Sitscan 250 Measured Thickness: 100 .500

DAS
47

Measured by: <i>mmml</i>
Date: 15/08/20

Audited by: 9-89
Date: 15-09-09

Preliminary Approval:
Date:

Rev	Date	Change	Revised by	Approved
B	12.02.02	Dwg Rev updated (P/O D350-748-201)	KJ	
C	12.06.04	Wall thickness form added	KJ	
D	13.02.27	Dimension 5.25 was 4.26	KJ	
E	14.04.25	122.70 dimension revised to 124.70	KJ	
F	15.04.14	Dwg Rev updated	KJ	